

REMARKS

Claims 1-25 are all the claims presently pending in the application. The claims have not been amended by the present Response.

Applicants gratefully acknowledge the Examiner's indication that claim 16 is allowed, and that claims 14 and 15 would be allowable if rewritten to overcome the rejection under 35 U.S.C. 112, second paragraph and rewritten in independent form. However, Applicants submit that all of claims 1-25 are allowable over the cited prior art references.

Furthermore, Applicants point out that the Office Action does not include a rejection under 35 U.S.C. 112, second paragraph. Therefore, claims 14 and 15 should be allowable if rewritten in independent form.

Claims 1-13 and 17-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable Sano et al. (U.S. Patent No. 5,116,254) (hereinafter "Sano") in view of Uenuma et al. (U.S. Patent Application No. 2003/0055545; hereinafter "Uenuma").

This rejection is respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention (e.g., as defined by exemplary claim 1) is directed to a vehicle steering apparatus. The vehicle steering apparatus includes a steering mechanism for turning a steerable tired-wheel, a steering actuator for providing a steering force to the steering mechanism, a load detecting unit for detecting a tire load, which is a load applied to a tire of a vehicle, and a steering control unit for controlling the steering actuator according to the tire load detected by the load detecting unit (e.g., see Application at page 7, line 20 through page 8, line 6). This combination of features is important for enabling steering control in which the road conditions are accurately reflected based on the detected load applied to the tire (see Application at page 7, lines 1-5).

II. THE PRIOR ART REFERENCES

The Examiner alleges that Sano would have been combined with Uenuma to teach the claimed invention of claims 1-13 and 17-25. Applicants submit, however, that these references would not have been combined as alleged by the Examiner.

First, Applicants point out that the Examiner's rejection is not clear. That is, the Examiner alleges that Sano teaches "a steering actuator (8) for providing a steering force to the steering mechanism" (see Office Action dated September 7, 2006 at page 2). In the same rejection, the Examiner contradictorily indicates that Sano "fails to specifically disclose a steer by wire system or a steering actuator for providing a steering force to the steering mechanism" (see Office Action dated September 7, 2006 at page 4; emphasis added by Applicants). Therefore, it is unclear which reference the Examiner is relying on to teach the features of the claimed invention.

Accordingly, Applicants submit that Sano does not teach or suggest "*a steering actuator for providing a steering force to the steering mechanism*", as recited in claim 1, and somewhat similarly recited in claims 7 and 13.

The Examiner attempts to rely on Figures 1 and 8-12 of Sano to support his allegation. The Examiner, however, is clearly incorrect.

That is, nowhere in this figure (nor anywhere else for that matter) does Sano teach or suggest a steering actuator for providing a steering force to the steering mechanism. Indeed, in Sano the steer mechanism is directly controlled by the steering wheel.

The claimed invention is directed to a steer-by-wire vehicle steering system. A steer-by-wire vehicle steering system is a steering system wherein the mechanical linkage between the steering wheel and the steering mechanism is eliminated. Steering of the tires of the vehicle is achieved by converting motion of a steering actuator into a linear movement of a

turning shaft and then converting the linear movement of the turning shaft into turning movement of the front left and right steerable wheels (see Application at page 23, lines 12-24 and Figure 1). Therefore, as recited in exemplary claim 1, the steering actuator provides the steering force to the steering mechanism to control the front wheels of the vehicle.

In stark contrast, Sano is not directed to a steer-by-wire vehicle steering system. That is, Sano teaches a mechanical linkage between the steering wheel and the steering mechanism. Indeed, Sano teaches that the steering wheel (1) is connected to a gear box (3) through a steering shaft (2). A tire rod (4) connects the gear box (3) to the front wheels (5) through knuckle arms (6) (see Sano at Figure 1). Therefore, Sano clearly teaches that there is a direct mechanical connection from the steering wheel (1) to the steering mechanism (2,3). Sano does not teach or suggest an actuator for providing a steering force to the steering mechanism (2,3). Indeed, the steering force is directly applied to the steering mechanism (2,3) from the steering wheel (1).

The Examiner attempts to rely on the rear wheel servo-actuator (8) to support his allegations that Sano teaches or suggests a steering actuator for providing a steering force to the steering mechanism. The rear wheel servo-actuator (8) merely provides a signal from a computer (12) in the vehicle to maintain the steering of the rear wheels in accordance with the mechanically steered front wheels. The rear wheel servo-actuator (8) does not provide a steering force to the steering mechanism to control the steering of the front wheels, as recited in exemplary dependent claim 22.

Therefore, Applicants submit that Sano does not teach or suggest each and every feature of the claimed invention.

The Examiner further alleges that Uenuma would have been combined with Sano to make up the deficiencies of Sano. Specifically, the Examiner alleges that Uenuma teaches a vehicle control system including a steering actuator for providing a steering force to the

steering mechanism. The Examiner attempts to rely on paragraph [0011] of Uenuma to support his allegations.

Applicants submit, however, that these references would not have been combined as alleged by the Examiner. That is, M.P.E.P. § 2143.01 states: “If the proposed modification or combination of the prior art would change the principal of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious” (emphasis added by Applicants).

Sano is directed to a steering system for a vehicle that mechanically steers the front wheels of the vehicle. That is, as shown in Figure 1, the steering wheel (1) is mechanically connected to a gear box (3) through a steering shaft (2). The gear box (3) is mechanically connected to the front wheels (5). The front wheels (5) are steered in accordance with a turning of the steering wheel (1).

The steering system of Uenuma is directed to a steering system including a control system for steering the wheels of the vehicle. Instead of mechanically steering the wheels of the vehicle, the steering system in Uenuma steers the wheels by a powered actuator (e.g., see Uenuma at paragraph [0002]).

Thus, Applicants submit that modifying Sano as alleged by the Examiner would change the principle of operation of the steering system in Sano because the steering system in Sano would no longer provide a mechanical steering system. Therefore, one of ordinary skill in the art would not have been motivated to modify Sano by the teachings of Uenuma.

Furthermore, Applicants point out that the Examiner has not addressed the features of dependent claims 21 and 23-25 in his rejections. If the Examiner wishes to maintain this rejection, Applicants request the Examiner to address each and every feature of the claimed invention in his rejection.

Therefore, Applicants submit that Sano and Uenuma would not have been combined as alleged by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION


In view of the foregoing, Applicants submit that claims 1-25, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: December 7, 2006



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